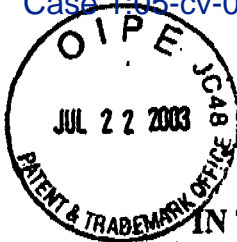


EXHIBIT D



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Appl. No. : 09/814,828 Confirmation No.: 4728
Applicant : Sai Chan Yun, et al.
Filed : March 23, 2001
TC/A.U. : 2812
Examiner : Angel Roman
For : TAPE CARRIER PACKAGE WITH DUMMY BENDING PART
AND LIQUID CRYSTAL DISPLAY EMPLOYING THE SAME

Docket No. : 8733.246.00
Customer No. : 30827

Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action of March 24, 2003, please amend the above-identified application as follows:

- **Amendments to the Specification** begin on page 2 of this paper.
- **Amendments to the Claims** are reflected in the listing of claims which begins on page 4 of this paper.
- **Amendments to the Drawings** begin on page 10 of this paper and include a replacement sheet.
- **Remarks** begin on page 11 of this paper.
- An Appendix including amended drawing figures is attached following page 11 of this paper.

Amendments to the Specification

Please replace the paragraph at page 3, line 10 with the following amended paragraph:

“The TAB method may be divided into a bending type as shown in Fig. 1A, and a flat type as shown in Fig. 1B. The bending-type TAB system as shown in Fig. 1A has been used for a mounting of source and gate drivers of a monitor or a notebook computer. In the bending-type TAB system, a PCB 6 is folded to the rear side of a liquid crystal panel 2 by bending a tape carrier package (TCP) 10 mounted with a D-IC 8 and connected between a lower glass substrate 3 of the liquid crystal panel 2 and the PCB 6. A backlight unit 4 is positioned below the liquid crystal display panel 2. As shown in Fig. 2 and Fig. 3, an adhesive 25 is coated on a base film 24 of the TCP 10, and a lead part 26 is adhered thereon. The lead part 26 made from copper (Cu) is connected to pins of the D-IC 8. On the lead 26 is coated a solder resistor 27 responsible for providing an insulator. At the upper end and the lower end of the base film 24, an input pad part 21 and an output pad part 22 extending from each lead of the lead part 26 are provided. The input pad part 21 is connected to an output signal wiring of the PCB while the output pad part 22 is connected to the gate line or the data line formed on a lower glass substrate 3. Bending parts 10a and 10b are provided between the input pad part 21 and the D-IC 8 and between the output pad part 22 and the D-IC 8, respectively. The base film 24 is removed from the bending parts 10a and 10b. The TCP 10 is easily bent with the aid of these bending parts 10a and 10b.”

Please replace the first paragraph of page 4 with the following amended paragraph:

“The flat-type TAB system as shown in Fig. 1B is mainly used to mount gate drivers of a 10.4” or 12.1” small-size notebook computer or monitor. In the flat-type TAB system, a TCP 12 mounted with a D-IC 8 and connected between a lower glass substrate 3 of a liquid crystal panel [[3]] 2 and a PCB 6 is arranged in parallel to the liquid crystal panel 2. Thus, since the TCP 12 connected between the liquid crystal panel 2 and the PCB 6 is not bent, no bending part is formed.”

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A liquid crystal display device, comprising:

a liquid crystal panel;

a printed circuit board; and

a tape carrier package connected to the liquid crystal panel and the printed circuit board,

the tape carrier package comprising[[],]:

a base film mounted with an integrated circuit chip for applying a signal to the liquid crystal panel;

an output pad part extending from the integrated circuit chip and having terminals connected to the liquid crystal panel[[],];

a dummy bending part in which a portion of the base film is removed in a direction perpendicular to the terminals of the output pad part for reducing a thermal expansion force and a thermal contraction force generated when thermal-pressing the output pad part onto the liquid crystal panel[[],];

a first bending part in which a second portion of the base film existing at a bent position between the dummy bending part and the integrated circuit chip is removed[[],]; and

an input pad part extending from the integrated circuit chip and having terminals connected to the printed circuit board[[],].

wherein the dummy bending part is formed at a position, close to any one of the output pad part or the input pad part, where the tape carrier package is not folded.

2. (Currently Amended) A liquid crystal display device, comprising:

a liquid crystal panel;

a printed circuit board; and

a tape carrier package connected to the liquid crystal panel and the printed circuit board,

the tape carrier package comprising:

a base film mounted with an integrated circuit chip for applying a signal to the liquid
crystal panel;

an output pad part extending from the integrated circuit chip and having terminals
connected to the liquid crystal panel;

a dummy bending part in which a portion of the base film is removed in a direction
perpendicular to the terminals of the output pad part for reducing a thermal expansion force and a
thermal contraction force generated when thermal-pressing the output pad part onto the liquid
crystal panel;

a first bending part in which a second portion of the base film existing at a bent position
between the dummy bending part and the integrated circuit chip is removed;

an input pad part extending from the integrated circuit chip and having terminals
connected to the printed circuit board; and

~~The liquid crystal display device of claim 1, wherein the tape carrier package further~~
comprises a second bending part in which a third portion of the base film existing at a bent
position between the input pad part and the integrated circuit chip is removed.

3. (Original) The liquid crystal display panel of claim 2, wherein the tape carrier package further comprises a second dummy bending part in which a fourth portion of the base film is removed in a direction perpendicular to the terminals of the output pad part.

4. (Original) The liquid crystal display device of claim 1, wherein the tape carrier package further comprises a second dummy bending part in which a third portion of the base film is removed in a direction perpendicular to the terminals of the output pad part.

5. (Currently Amended) A tape carrier package, comprising:
a pad part for connection to a liquid crystal panel;
a base film mounted with an integrated circuit chip for applying a signal to the liquid crystal panel; and
a dummy bending part for distributing a stress applied to the liquid crystal panel according to a thermal expansion of the pad part by removing a portion of the base film between the pad part and the integrated circuit chip[[.]].
wherein the dummy bending part is formed at a position, close to the pad part, where the tape carrier package is not folded.

6. (Original) The tape carrier package according to claim 5, further comprising a first bending part in which a second portion of the base film is removed at a bent position between the dummy bending part and the integrated circuit chip.

7. (Original) The tape carrier package according to claim 6, further comprising a second pad part for connection to a printed circuit board.

8. (Currently Amended) A tape carrier package, comprising:

a pad part for connection to a liquid crystal panel;

a base film mounted with an integrated circuit chip for applying a signal to the liquid crystal panel;

a dummy bending part for distributing a stress applied to the liquid crystal panel according to a thermal expansion of the pad part by removing a portion of the base film between the pad part and the integrated circuit chip;

a first bending part in which a second portion of the base film is removed at a bent position between the dummy bending part and the integrated circuit chip;

a second pad part for connection to a printed circuit board; and

~~The tape carrier package according to claim 7, further comprising~~ a second bending part in which a third portion of the base film is removed at a bent position between the second pad and the integrated circuit chip.

9. (Original) The tape carrier package according to claim 5, further comprising a second pad part for connection to a printed circuit board.

10. (Original) The tape carrier package according to claim 5, further comprising a second dummy bending part in which a second portion of the base film is removed.

11. (Original) The tape carrier package according to claim 10, further comprising a first bending part in which a third portion of the base film is removed at a bent position between the dummy bending part and the integrated circuit chip.

12. (Original) The tape carrier package according to claim 11, further comprising a second pad part for connection to a printed circuit board.

13. (Currently Amended) A tape carrier package, comprising:
a pad part for connection to a liquid crystal panel;
a base film mounted with an integrated circuit chip for applying a signal to the liquid
crystal panel;
a dummy bending part for distributing a stress applied to the liquid crystal panel
according to a thermal expansion of the pad part by removing a portion of the base film between
the pad part and the integrated circuit chip;
a second dummy bending part in which a second portion of the base film is removed;
a first bending part in which a third portion of the base film is removed at a bent position
between the dummy bending part and the integrated circuit chip;
a second pad part for connection to a printed circuit board; and

~~The tape carrier package according to claim 12, further comprising~~ a second bending part in which a fourth portion of the base film is removed at a bent position between the second pad and the integrated circuit chip.

14. (Original) A tape carrier package, comprising:

a base film mounted with an integrated circuit chip for applying a signal to a liquid crystal panel;

a pad part extending from the integrated circuit chip to be connected to the liquid crystal panel;

at least one bending part in which a portion of the base film is removed at an area where the tape carrier package is folded; and

at least one dummy bending part, in which a second portion of the base film is removed at a portion where the tape carrier package is not folded, thereby reducing a thermal expansion force and a thermal contraction force of the base film parallel to a longitudinal direction of the integrated circuit chip.

15. (Original) The tape carrier package according to claim 14, wherein said dummy bending part is positioned on the pad part.

Amendments to the Drawings

The attached sheet of drawings includes changes to FIG. 12. This sheet, which includes FIGs. 12-13, replaces the original sheet including FIG. 12-13. In FIG. 12, the line C-C has been removed.

Attachment: Replacement Sheet for FIGs 12-13

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The office action dated March 24, 2003 has been received and its contents carefully reviewed.

The Examiner objects to the drawings for including a reference sign, "4" in Figure 1A, that is not mentioned in the specification. Applicant has amended the specification to include a description of this reference number. No new matter is added by this amendment. Applicant respectfully requests the Examiner to withdraw the objection. Applicant also amends the specification to correct a minor typographical error, thereby overcoming the Examiner's objection. Applicant respectfully requests the Examiner to withdraw the objections to the drawings and specification.

Applicant also submits a new formal drawing for Figure 12 in an Appendix to this Paper.

Claims 1, 4-7, 9-12, 14 and are rejected under 35 U.S.C 102(b) as being anticipated by Tajima et al. (U.S. Patent No. 5,398,128). Applicant amends claims 1 and 5 to more clearly recite those features of the invention that were inherent in the original claims.

In the Office Action, claims 1, 4-7, 9-12, 14 and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,398,128 to Tajima et al. (hereinafter "Tajima"). Claims 5 and 9 are rejected under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent No. 5,668,700 to Tagusa et al. (hereinafter "Tagusa"). Claims 2, 3, 8 and 13 are objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant rewrites claims 2, 3, 8, and 13 in independent form, including all of the limitations of the base claim and any intervening claims, and respectfully submits that these claims as amended are allowable.

The rejection of independent claim 1 is respectfully traversed and reconsideration is requested. Claim 1 is allowable over the cited references in that this claim recites a combination of elements including, for example, "wherein the dummy bending part is formed at a position, close to any one of the output pad part or the input pad part, where the tape carrier package is not folded" (claim 1). None of the cited references including Tajima and Tagusa, singly or in combination, discloses, teaches or suggests at least this feature of the claimed invention.

The rejection of independent claim 14 is respectfully traversed and reconsideration is requested. Claim 14 is allowable over the cited references in that this claim recites a combination of elements including, for example, "a second portion of the base film is removed at a portion where the tape carrier package is not folded" (claim 14). None of the cited references including Tajima and Tagusa, singly or in combination, discloses, teaches or suggests at least this feature of the claimed invention.

For example, the structure of claims 1 and 14 of the present invention is different from the Tajima structure in that in Tajima, the base film 1 is removed only where the tape carrier package is folded (Tajima, element 2 in Figures 1-5). The gaps identified by the Examiner are not bending parts formed by removing a portion of the base film (identified as element 1 in Tajima). The Examiner incorrectly identifies element 5 as the base film; however, Tajima clearly indicates that element 5 is a solder resist (Tajima, column 3, lines 33-36). Therefore, Tajima does not show the bending parts as required by claims 1 and 14.

The rejection of independent claim 5 is respectfully traversed and reconsideration is requested. Claim 5 is allowable over the cited references in that this claim recites a combination of elements including, for example, "wherein the dummy bending part is formed at a position, close to the pad part, where the tape carrier package is not folded" (claim 5). None of the cited references including Tajima and Tagusa, singly or in combination, discloses, teaches or suggests at least this feature of the claimed invention.

For example, the structure of claim 5 of the present invention is different from the Tagusa structure in that in Tagusa, the substrate 2 is partially removed only where the wiring board 42 is folded (Tagusa, elements 2b and 2c in Figure 6 and column 14, lines 24-55). Furthermore, in Tagusa, no part of the substrate 2 is removed between the pad part and the integrated circuit 1 as required by the claim.

Therefore, independent claims 1, 5, and 14 are allowable at least for these reasons. Applicant submits that claim 4, claims 6, 7, 9-12, and claim 15, which depend from claims 1, 5, and 14, respectively, are allowable over the cited references.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Amendment dated July 22, 2003

Reply to Office Action of March 24, 2003

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911. A duplicate copy of this sheet is enclosed.

Dated: July 22, 2003

Respectfully submitted,

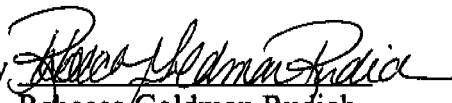
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FIG. 12

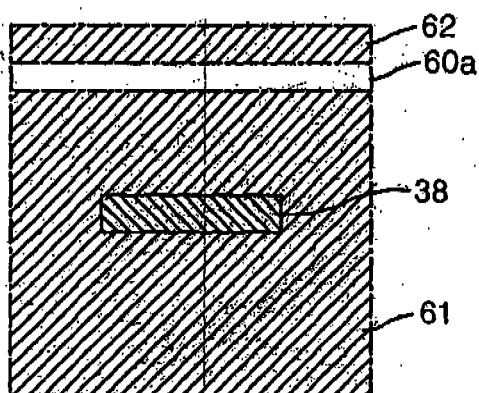


FIG. 13

